

DIGITAL PHOTOGRAPH SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to a digital photograph
5 system using a camera for taking digital photographs.

There are conventionally known lens-equipped films (re-
cycling cameras) available at low prices because the bodies
thereof are recycled. Such recycling cameras have not only
an advantage of improving the convenience for users, but also
10 an advantage of providing a possibility of profiting from
added values for film manufacturers.

The conventional recycling cameras however have the fol-
lowing disadvantages. Since the recycling cameras employ a
silver halide photographic method, it is not possible to se-
15 lect a photograph to be developed during development. In ad-
dition, a plurality of cameras are required if many
photographs are to be taken. In reverse, if only a few pho-
tographs are taken, the remaining part of the film is wasted,
or developing of the photographs is postponed until the en-
20 tire film is used.

Digital cameras, which do not involve use of a film,
have an advantage that selection of a photograph and determi-
nation of the number of photographs taken can be done com-
paratively freely. Digital cameras however have a
25 disadvantage that the unit price per photograph is high com-

pared with cameras employing the silver halide photographic method.

SUMMARY OF THE INVENTION

5 The object of the present invention is providing a digital photograph system capable of reducing the print unit price.

10 In order to attain the above object, the digital photograph system of the present invention includes: a camera having a function of storing data of a digital photograph taken; and a terminal for reading the photograph data stored in the camera, outputting the photograph data, and thereafter collecting the camera for recycling. This construction achieves recycling of the camera, and thus the print unit price can be
15 reduced.

20 Alternatively, the digital photograph system of the present invention includes: a camera having a function of storing data of a digital photograph taken; a terminal for reading the photograph data stored in the camera and outputting the photograph data; and an advertising server connected to the terminal via a network, wherein the advertising server provides advertisement data to be added to the photograph data output from the terminal. By adding an advertisement to the photograph, the print unit price can be reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram illustrating the overall construction of an embodiment of the digital photograph system of the present invention.

5 FIG. 2 is a conceptual view for description of recycling of a digital camera in the digital photograph system of FIG. 1.

10 FIG. 3 is a conceptual view for description of a function of an advertising server in the digital photograph system of FIG. 1.

FIG. 4 is a conceptual view for description of an alternative function of the advertising server in the digital photograph system of FIG. 1.

15 FIG. 5 is an external view of the digital camera in the system of FIG. 1.

FIG. 6 is a block diagram of a schematic construction of the digital camera in the system of FIG. 1.

FIG. 7 is a block diagram of a detailed construction of the digital camera in the system of FIG. 1.

20 FIG. 8 is a flowchart of the photographing operation of the digital camera in the system of FIG. 1.

FIG. 9 is a flowchart of the image output operation of the digital camera in the system of FIG. 1.

25 FIG. 10 is an external view of a terminal in the system of FIG. 1.

FIG. 11 is a block diagram of a schematic construction of the terminal in the system of FIG. 1.

FIG. 12 is a block diagram of a detailed construction of the terminal in the system of FIG. 1.

5 FIG. 13 is a flowchart of the operation of reading data from the digital camera performed by the terminal in the system of FIG. 1.

FIG. 14 is a flowchart of the operation of printing a photograph performed by the terminal in the system of FIG. 1.

10 FIG. 15 is an exemplary illustration of a graphical user interface (GUI) for selecting whether or not an advertisement should be added displayed on the terminal in the system of FIG. 1.

FIG. 16 is an exemplary illustration of a GUI for selection of a photograph to be printed displayed on the terminal in the system of FIG. 1.

FIG. 17 is an exemplary illustration of an advertisement-added photograph printed by the terminal in the system of FIG. 1.

20 FIG. 18 is an exemplary illustration of an entry form for a prize contest in the system of FIG. 1.

FIG. 19 is a block diagram of a detailed construction of the advertising server in the system in FIG. 1.

FIG. 20 is a flowchart of the advertisement distribution operation of the advertising server in the system of FIG. 1.

FIG. 21 is an exemplary illustration of a GUI for selection of the photograph output destination displayed on the terminal in the system of FIG. 1.

FIG. 22 is an exemplary illustration of a GUI for entry of an e-mail address displayed on the terminal in the system of FIG. 1.

FIG. 23 is an exemplary illustration of photograph data to be transmitted by e-mail in the system of FIG. 1.

FIG. 24 is an exemplary illustration of a GUI for entry of a password displayed on the terminal in the system of FIG. 1.

FIG. 25 is an exemplary illustration of a Web registration information card output from the terminal in the system of FIG. 1.

FIG. 26 is an exemplary illustration of a log-in screen of a photograph server on the Web in the system of FIG. 1.

FIG. 27 is an exemplary illustration of a Web page design for browsing photographs in the system of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, an embodiment of the present invention will be described with reference to the accompanying drawings.

FIG. 1 illustrates the overall construction of an embodiment of the digital photograph system of the present invention. Referring to FIG. 1, the digital photograph system

of this embodiment includes: a digital camera 1 for taking digital photographs; a terminal 2 for reading data in the digital camera 1 and printing the data; an advertising server 3 for managing advertisements to be added to photographs; a maintenance server 4 for scheduling actions to be taken in response to notifications from the terminals 2 of being out of paper, out of ink, out of order, and the like; and a photograph server for temporarily storing photographs on the Web. The components 2 to 5 are connected to the Internet via dial-up connection and IP connection. The connection to the Internet may be established by other schemes, such as packet communications using Personal Handy Phone Systems (PHS) or cellular phones. The servers 3 to 5 may be implemented by one personal computer or one work station. Any of these servers may be omitted depending on the services to be provided. For example, the photograph server 5 may be omitted if the service of holding photograph data on the Web is not provided.

Using the system of FIG. 1, the following can be realized, for example. A user purchases a digital camera 1 in a pleasure resort such as an amusement park. After taking photographs with the digital camera 1, the user connects the digital camera 2 to the terminal 2 placed somewhere in the park and prints a photograph the user likes among others on the spot. Since the body of a digital camera costs compara-

tively high, the price of the digital camera should desirably include an insurance against possible failure in recovery of the body due to loss or theft. An advertisement may be printed on the bottom portion of the photograph so that the proportion of the cost borne by the user can be reduced with the advertisement charge. This advertising is also advantageous for an advertiser because it is rational to pay an amount corresponding to the number of photographs actually printed. Furthermore, the user can temporarily upload the photograph taken to the Web, to download the photograph image to the user's personal computer afterwards. This is very convenient when the user desires to reuse the photograph for making a greeting card and the like. In a facility having gates at the entrance and the exit, such as an amusement park, it is also possible to lend digital cameras to visitors who want them free of charge at the entrance, and get them back at the exit.

In the system of FIG. 1, digital cameras can be recycled as illustrated in FIG. 2. In FIG. 2, note that the open terminal in the street may be placed inside the store.

The advertising may be implemented in the procedures (1) through (6) shown in FIG. 3, including the issuance of a billing statement to the advertiser by the advertising server. Advertising conditions, such as the area in which an advertisement should be spread and the upper limit of the number

of times of printing of the advertisement, may be set at the entry of advertisement data.

Alternatively, the advertising server may act in the procedures (1) to (6) shown in FIG. 4. In this case, assume
5 that the advertiser signs a contract with the advertising server in advance, together with notification of the bank account of the advertiser for automatic transfer of the charge.

Hereinafter, the respective components constituting the system of FIG. 1 will be described.

10 FIG. 5 is an external view of the digital camera 1 in the system of FIG. 1, and FIG. 6 illustrates a schematic construction of the digital camera 1, which is basically the same as that of a standard digital camera. Referring to FIG. 5, the digital camera 1 includes a shutter 101, a
15 flash 102, a finder 103, a lens 104, a battery 105, a battery charging terminal 106, an output terminal 107 for outputting data in a FROM 113, a flash switch 108 for switching ON/OFF of the flash 102, and a count display 109 for displaying the number of remaining photographs allowed to be taken. Refer-
20 ring to FIG. 6, the digital camera 1 further includes a CPU 110 for executing a program, a ROM 111 for storing the program, a RAM 112 for reading the contents in the ROM 111 as required, the FROM 113 for storing data, a CCD 114 for converting light obtained through the lens 104 into image infor-
25 mation, and a capture section 115 for capturing digital

still-picture data from dynamically changing digital information in the CCD 114. The FROM 113 may be omitted if the contents in the RAM 112 can be backed up by use of the battery 105. In this relation, another button battery may be provided for the backing-up. As the count display 109, any display devices including a liquid crystal display device may be used.

FIG. 7 illustrates a detailed construction of the digital camera 1 in the system of FIG. 1. Referring to FIG. 7, an image storage section 202 stores a photograph image taken, an output destination verification section 203 verifies whether or not the terminal 2 is an authorized terminal when the digital camera 1 is connected to the terminal 2, and an image output section 107 outputs the photograph image in the image storage section 202 via the output terminal 107.

FIG. 8 shows the photographing operation of the digital camera 1 in the system of FIG. 1. First, in step a1, the capacity of the image storage section 202 is examined to determine whether or not the number of remaining photographs allowed to be taken is zero. If it is zero, the process proceeds to step a2, where the fact that all the photographs allowed have been taken is displayed on the count display 109, and the process is terminated. In step a3, whether or not the shutter 101 has been pressed is detected. If the shutter 101 has been pressed, the process proceeds to step a4,

where whether or not the flash switch 108 is ON is examined. If it is ON, the process proceeds to step a5. Otherwise, the process proceeds to step a6. In step a5, the flash 102 is lit. In step a6, the image data obtained through the CCD 114 is captured by the capture section 115. In step a7, the image data captured in step a6 is stored in the image storage section 202. In step a8, the number of remaining photographs allowed to be taken of the counter is decremented by one. In step a9, the counter value obtained in step a8 is displayed on the count display 109. The process then returns to the start.

FIG. 9 shows the image output operation of the digital camera 1 in the system of FIG. 1. First, in step b1, connection of the digital camera 1 to the terminal 2 is determined by examining whether or not a voltage is detected at the output terminal 107. If a voltage is detected, the process proceeds to step b2, where whether or not the terminal is an authorized terminal is verified by the output destination verification section 203. This verification of the terminal is performed for the purpose of keeping the recovery rate of the digital cameras from decreasing by blocking retrieval of data in the digital camera for recycling by an unauthorized apparatus. This function can also be used for the purpose of ensuring optimum printing by the terminal that can identify the specifications of the digital camera such as the type and

resolution thereof. In step **b3**, whether or not the verification in step **b2** has succeeded is determined. If succeeded, the process proceeds to step **b5**. Otherwise, the process proceeds to step **b4**, where occurrence of the error is displayed on the count display **109**, and the process is terminated. In step **b5**, all the image data taken are transferred to the terminal **2** from the image output section **204**. In step **b6**, whether or not the data output has succeeded is examined. If succeeded, the process proceeds to step **b7**. Otherwise, the process proceeds to step **b4**. In step **b7**, the fact that the data output has succeeded is displayed on the count display **109**, and the process is terminated.

In the illustrated example, the digital camera **1** includes the FROM **113** for storing images and the output destination verification section **203** for blocking retrieval of data by an unauthorized terminal. Alternatively, a semiconductor memory provided with the verification function, such as a SD memory card, may be used in place of the FROM **113** and the output destination verification section **203**.

FIG. **10** is an external view of the terminal **2** in the system of FIG. **1**, and FIG. **11** illustrates a schematic construction of the terminal **2**. Referring to FIG. **10**, the terminal **2** includes: a display **301** for displaying a graphical user interface (GUI); a camera receiving recess **302** in which the digital camera **1** is placed; an input terminal **303** to

which the digital camera 1 is connected; a coin insertion slot 304 through which the charge is paid; a operation panel 305 for manipulating the GUI; and a photograph outlet 306 to which a printed photograph is ejected. Referring
5 to FIG. 11, the terminal 2 further includes: a HDD 307 for storing a program and data; a printer 308 for printing a digital image on a sheet; and a modem 309 for accessing the Internet. The illustrated system is constructed to use the modem under the dial-up connection. The terminal unit may
10 otherwise be constructed to use other communication infrastructures such as ISDN and FTTH. The operation panel may be integrated with the display by using a touch-panel display.

FIG. 12 illustrates a detailed construction of the terminal 2 in the system of FIG. 1. Referring to FIG. 12, a
15 camera verification section 401 verifies that the digital camera connected to the input terminal 303 is of a compatible type. An image read section 402 reads image data from the connected digital camera 1. A temporary image storage section 403 temporarily stores the image data read by the image
20 read section 402. A GUI generation section 404 changes the GUI display in response to the input through the operation panel 305 and the like. A communication control section 405 establishes communications with the advertising server 3 and the like by use of the modem 309.

25 FIG. 13 shows the operation of reading data from the

digital camera 1 performed by the terminal 2 in the system of
FIG. 1. First, in step c1, whether or not the digital cam-
era 1 has been connected to the input terminal 303 is exam-
ined. If connected, the process proceeds to step c2, where
5 whether or not the connected digital camera 1 detected in
step c1 is of a compatible type is verified. In step c3,
whether or not the verification in step c2 has succeeded is
examined. If succeeded, the process proceeds to step c5.
Otherwise, the process proceeds to step c4, where occurrence
10 of the error is displayed on the display 301, and the process
is terminated. In step c5, all the image data are read from
the digital camera 1. During the read operation, the camera
body may be locked to the terminal so that the digital cam-
era 1 is prevented from disjoining from the input termi-
15 nal 303. In step c6, whether or not the data read has
succeeded is determined. If succeeded, the process proceeds
to step c7. Otherwise, the process proceeds to step c4. In
step c7, a lid provided to cover the camera receiving re-
cess 302 is closed, for recovery of the digital camera 1.
20 Step c7 is skipped if it has been found that this digital
camera is not recyclable during the verification in step c2.
In step c8, GUIs guiding the procedure for printing the read
photograph are displayed, and the process is terminated.

FIG. 14 shows the operation of printing a photograph
25 performed by the terminal 2 in the system of FIG. 1. First,

in step d1, the GUI shown in FIG. 15 is displayed, and whether or not the option "advertisement added" has been selected via the operation panel 305 is examined. If selected, the process proceeds to step d2. Otherwise, the process proceeds to step d3. In step d2, a flag is set to distinguish the selection of "advertisement added". In step d3, the GUI shown in FIG. 16 is displayed to allow selection of a photograph desired via the operation panel 305. This selection is performed in a general manner of manipulating a stick to move a cursor and pressing a button to confirm the entry. In step d4, whether or not the selection end button has been pressed is examined. If pressed, the process proceeds to step d5. Otherwise, the selection in step d3 is continued. In step d5, the total amount of charge, calculated from the number of selected photographs and the state of the flag, is displayed prompting to drop coins in the slot. In step d6, whether or not the amount displayed in step d5 has been paid is examined. If paid, the process proceeds to step d7, where the outline of the print is displayed on the display 301. In step d8, whether or not the flag of "advertisement added" has been set is examined. If set, the process proceeds to step d10. Otherwise, the process proceeds to step d9, where the selected photograph is output via the printer 308, and the process is terminated. In step d10, advertisement data is retrieved from the advertising server 3. More types of

advertisements should be retrieved as the number of selected photographs increases. For example, assuming that the advertising server 3 has five types of advertisements, four types of advertisements are randomly retrieved if the number of
5 photographs is less than five, and all the five types are retrieved if the number of photographs is five or more. In step d11, the advertisement retrieved in step d10 is added to the selected photograph. When the number of selected photographs is greater than the number of types of advertisements,
10 the advertisements are randomly selected for the excessive photographs.

FIG. 17 shows an example of the synthesized print output when the option "advertisement added" was selected. In FIG. 17, the selected photograph is printed on the upper part
15 of the print while the advertisement is printed on the lower part. The printing sheet may be perforated as the example in FIG. 17 so that the advertisement part can be torn off from the photograph part. This will afford convenience to the advertiser who intends to launch a campaign such as a prize
20 contest urging the users to collect a plurality of torn-off advertisement coupons and send an entry form as shown in FIG. 18. In addition, for users who are to store printed photographs, the storage space can be saved by tearing off the advertisement part.

25 In the illustrated example, the advertisement data are

held by the advertising server 3. Alternatively, a cache may be provided in the HDD 307 of the terminal 2, and the type of advertisement that has been previously retrieved may be held in the cache. In this case, the advertising server 3 may only be notified of the use. As yet another method, the terminal 2 may periodically download advertisement data from the advertising server 3, and simultaneously notify the advertising server 3 of the number of advertisements actually printed. The system of the present invention may also be applied to commercially available semiconductor memories such as compact flash (CF) cards. That is, a reader for reading image data accumulated in such a semiconductor memory may be provided in the system, in place of the camera receiving recess 302 and the input terminal 303, to enable execution of the procedures of steps d1 through d11 for the image data while omitting the procedures of steps c1 through c8.

FIG. 19 illustrates a detailed construction of the advertising server 3 in the system of FIG. 1. Referring to FIG. 19, a connection request processing section 501 processes a connection request from the terminal 2, and a terminal verification processing section 502 verifies the terminal that has sent a connection request. An advertisement counter 503 counts the number of advertisements added to photograph prints at the terminal 2 for each type. An advertisement management section 504 manages updating of the

advertisements to be distributed to the terminal 2 by examining the time stamps and the like attached to the advertisements. An advertisement accumulation section 505 accumulates advertisement data, and an advertisement transmission section 506 transmits advertisement data to the terminal 2. Note that the advertisements in the advertisement accumulation section 505 are updated by the operator for the advertising server 3.

FIG. 20 shows the advertisement distribution operation of the advertising server 3 in the system of FIG. 1. In this embodiment, assume that an advertisement list has been distributed in advance to the terminal 2, and at the synthesis of a print, the advertisement to be added to a photograph is determined and the determined advertisement data is retrieved from the advertising server 3. Assume also that whenever advertisement data is updated, the terminal 2 downloads an updated advertisement list from the advertising server 3. Moreover, assume that the advertisement supplier can set the upper limit for the advertisement counter 503 for each advertisement data so as to prevent the advertisement cost from greatly exceeding a predicted value due to unexpectedly high use rate. In step e1, whether or not a connection request from the terminal 2 has been received is examined. If received, the process proceeds to step e2, where the terminal 2 is verified by requesting the terminal 2 to send its ID and password. In step e3, whether or not the verifi-

password. In step e3, whether or not the verification of the terminal 2 has succeeded is examined. If succeeded, the process proceeds to step e4. Otherwise, the process is terminated. In step e4, whether or not updating has been made
5 for the advertisement data in the advertisement accumulation section 505 is examined. If made, the process proceeds to step e5. Otherwise, the process proceeds to step e6. In step e5, the advertisement list in the terminal 2 is updated. In step e6, the advertisement request from the terminal 2 is
10 accepted. In step e7, whether or not the counter value for the requested advertisement has exceeded a preset value is examined. If the value has exceeded, the process proceeds to step e8. Otherwise, the process proceeds to step e9. In step e8, the advertisement is changed to one for which the
15 advertisement counter value is minimum. In step e9, the advertisement data is read from the advertisement accumulation section 505 and transmitted to the terminal 2. In step e10, the counter value for the advertisement data transmitted in step e9 is incremented by one.

20 In this embodiment, the counters 503 for the respective advertisement data added to the photograph prints are collectively managed by the advertising server 3. This enables the advertising server 3 to bill each advertiser for the advertisement charge corresponding to the number of prints to
25 which the advertisement was added. Specifically, as shown in

FIGS. 3 and 4, the advertising server 3 outputs a billing statement corresponding to the count of the advertisement counter 503 to each advertiser. Part of the received payment is passed on to compensate the discount of the prints, and
5 the remainder can be the income from the advertising.

In this embodiment, advertisement data from advertisers are stored in the advertising server 3. Alternatively, character-featuring designs may be provided as a tie-up project with an amusement park or the like and added to photographs
10 of users who want the designs at value-added charges.

The maintenance server 4 will be described. The terminal 2 notifies the maintenance server 4 of occurrence of any inconvenience such as out of paper, out of ink, and paper jam when such inconvenience occurs by use of the network connection function of the terminal 2. By this operation, swift
15 maintenance of the terminal 2 is attained.

The photograph data may also be transmitted by e-mail from the terminal 2. In the above embodiment, data read by the terminal 2 from the digital camera 1 was printed with the
20 printer 308. Alternatively, the read photograph data may be sent by e-mail to a desired destination by use of the modem 309 and the communication control section 405. To realize this function, after a photograph is selected at the GUI shown in FIG. 16, for example, the GUI shown in FIG. 21 may
25 be displayed to prompt the user to select the method by which

the photograph is output. If the option "send the photograph by e-mail" is selected, the GUI for input of an e-mail address as shown in FIG. 22 is displayed on the display 301. As in the case of printing the photograph, if the option "advertisement added" had been selected, the resultant photograph data attached to the e-mail includes an advertisement as shown in FIG. 23. According to this method, it is possible, for example, to send a picture card to a friend from the terminal 2 on the road. Characters can be written on the image or a message can be input by use of a touch pen or the like. Naturally, the photograph data may be sent to the user's own e-mail address to be processed later by the user for use in a greeting card and the like.

If the option "hold the photograph on the Web" is selected as the photograph output destination shown in FIG. 21, the GUI for setting a password as shown in FIG. 24 is displayed. Setting of the user's password is requested to prevent access of an outsider to the photograph data. Once the photograph is held in the photograph server 5 on the Web, the terminal 2 outputs a card as shown in FIG. 25. Since only a limited amount of data can be held on the Web, it is realistic to hold photograph data for only a limited period of time. The card shown in FIG. 25 includes the address for accessing the Web, the ID, and the expiry date until which the photograph data is held. The password is not printed to prevent

access of an outsider to the photograph data in case that the card is lost. When the user accesses the photograph server 5, a screen as shown in FIG. 26, for example, is displayed. By inputting the ID found on the card and the password set at the GUI shown in FIG. 24, a screen as shown in FIG. 27 is displayed. The screen includes the photographs taken displayed in a thumbnail sketch and a banner advertisement arranged at a predetermined position. The user is now allowed to download the photograph data freely. According to this method, for example, the user can go to a pleasure resort without carrying a camera and rent a digital camera at the resort to take photographs. Afterwards, the user can process the photographs freely, and also share the photograph data with a friend by notifying the friend of the ID and the password. It should be noted that the illustrated GUIs and the Web registration information card shown in FIG. 25 are mere examples. For these GUIs and cards, other designs may be adopted.

Naturally, the function of selecting "advertisement added" or "no advertisement added" may be omitted, so that an advertisement is always added to a photograph.

While the present invention has been described in a preferred embodiment, it will be apparent to those skilled in the art that the disclosed invention may be modified in numerous ways and may assume many embodiments other than that

specifically set out and described above. Accordingly, it is intended by the appended claims to cover all modifications of the invention that fall within the true spirit and scope of the invention.

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